

Observations upon the dissemination of seeds.—In the fall of 1894 working as a student in Cornell University upon the dissemination of plants, I made a few rather interesting measurements, showing with some definiteness the effectiveness of certain adaptations.

My apparatus was very simple, two sheets of white cheese cloth, nine by twelve feet, to spread beside the plants and make the falling seeds more readily distinguishable, and a tape line for the measurements.

I worked first with two bushes of *Hamamelis Virginica* standing close together. They were about eight feet high, and had branches extending about four feet out from the main stem. Most of the capsules had been split across by previous frosts, and, on the clear October day of my observations, were opening as they dried. Apparently the inner woody layer of the capsule curves inward in drying, producing pressure upon the tapering ends of the polished seeds that is finally great enough to overcome resistance, when the seeds are shot away with considerable violence. In the case in question, shooting of the seeds began a little before one o'clock, continuing with increasing activity up to nearly five, and then diminishing in frequency until sunset. In this time upon the sheets, stretching as they did seventeen feet from the main stems of the bushes, and covering an area from nine to twelve feet wide, about one-fifth of a circle of the same radius, there fell no less than 153 seeds, of which a number were within four or five feet of the stems, many more at the extreme limit of the sheet, seventeen feet, but the largest number at a distance of about ten feet. How much farther they may have gone it is impossible to say, but one naturally infers from the numbers at the extreme limit of the sheet that some did go further. The distance travelled by the seed is doubtless dependent in large measure on the angle of the expelling capsule, plainly being greatest where that is forty-five degrees above the horizon, and the smallest when the pod is perpendicular. I am planning to make further measurements in the near future upon hamamelis and upon other plants which sling their seeds or fruits through their own mechanism; e. g., impatiens, oxalis, and others.

My other observations were made upon plants with upright or ascending pods opening only at the apex, a condition precluding the possibility of direct fall from the capsule to the ground, and rendering necessary a swaying motion of the plant and a consequent *throw* of the seed for its escape.

A plant of *Enothera biennis*, twenty-one inches high with the lowest pods six inches from the ground, showed the following results in a light intermittent breeze of a late October day: At one observation

sixteen seeds were scattered toward the wind, the nearest at two inches, and with twelve between thirty-five and forty-three inches; and thirty went with the wind from eight to forty-seven inches away. Later the nearest were a few at four inches and more than sixty were scattered between twenty-three and thirty-six inches. Other observations taken at the same time on seeds of *verbascum*, *dipsacus*, and *polanisia* while less definite were nevertheless of the same general significance. Later observations on a new *œnothera* plant thirty inches high and with lowest pods eleven inches from the ground, extending over a longer period and with stronger winds, showed at one time the nearest seed alone at twenty-two and one-half inches from the plant stem, and upwards of 160 scattered over the sheet, being very numerous at the extreme limit, thirteen feet. At another time they were found in large numbers from four feet to the extreme limit.

During the same period observations upon *Datura Stramonium* with its erect prickly capsules and large pitted seeds gave the following results: one seed at five feet, one at four, and one at four and one-half; later one at one foot, twenty-two from two and one-half to seven and one-half feet; still later, fourteen scattered from twenty inches to ten feet, with perhaps the majority at about six feet. This plant was forty-four inches high with its lowest pods twenty-seven inches from the ground.

Thus, this modification is seen to be very effective. Its importance is realized when one notes that in the Cayuga flora seventy-five genera are so disseminated. These genera are scattered through widely separated families from the *Juncaceæ* to the *Lobeliaceæ* being especially abundant among the *Scrophulariaceæ* and the *Caryophyllaceæ* and quite numerous also in the *Ranunculaceæ* and *Ericaceæ*. Furthermore other modifications with similar effects occur; upright heads, the achenes often provided with embracing chaff, drooping pods opening only at the base, and persistent ascending calyx and bracts opening only upward.—MARGARET FURSMAN BOYNTON.

Some western weeds, and alien weeds in the west.—A paper by Prof. L. H. Pammel, in a volume of the *Proc. Iowa Acad. Sci.*, leads me to offer a few remarks. Prof. Pammel discusses in detail the distribution of certain weeds, and points out how little has been done to record the spread of introduced plants in this country. Two of the species thus discussed are *Solanum rostratum* and *S. Carolinense*. The latter species is not cited from Colorado or New Mexico, nor had I ever seen it in these regions, until this year I gathered it in an orchard at Albuquerque, N. M. The case of *S. rostratum* is widely